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**United States Patent** [19]

Abramovitch et al.

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[54] **RE-WRITABLE OPTICAL DISK HAVING  
REFERENCE CLOCK INFORMATION  
PERMANENTLY FORMED ON THE DISK**

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[75] **Inventors:** Daniel Y. Abramovitch, Palo Alto,  
Calif.; David K. Towner, Boise, Id.

[73] **Assignee:** Hewlett-Packard Company, Palo Alto,  
Calif.

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[52] **U.S. Cl.** ..... 369/47; 369/59

[58] **Field of Search** ..... 369/275.3, 275.4,  
369/44.26, 47, 48, 54, 58, 59, 275.1

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*Primary Examiner*—Thang V. Tran

*Attorney, Agent, or Firm*—Brian R. Short

[57] **ABSTRACT**

An optical disk structure and optical disk recorder which enables data to be rewritten onto the recording layer of the optical disk. A clock reference structure is permanently formed along servo tracks of the optical disk. An optical transducer is coupled to the clock reference structure and generates a clock reference signal simultaneously with writing new data onto the recording layer of the optical disk. The data is written as data marks along the servo tracks. Each of the data marks includes edges. The edges of the data marks are recorded in synchronization with a write clock. The write clock is phase-locked with the clock reference signal. Therefore, the edges of the data marks are aligned with the clock reference structure with sub-bit accuracy. Standard DVD-ROM disk readers are not able to detect the high spatial frequency of the clock reference structure. Therefore, the optical disk structure and optical disk recorder of this invention allow production of re-writable optical disks which can be read by standard DVD-ROM disk readers.

**37 Claims, 16 Drawing Sheets**

